XXXII. *Observations made at* Leicester *on the Tranſit of* Venus *over the* Sun, June 3, 1769. *By the Reverend Mr.* Ludlam, *Vicar of* Norton, *near* Leiceſter.

Read Nov. 16, 1769.

THE teleſcope, uſed for viewing the planet, was made by Mr. Dollond, with a triple object glaſs of $33\frac{1}{3}$ inches focal diſtance, and was found by experiment to magnify 54 times. The clock was firmly fixed; its pendulum rod was made of wood. The tranſit teleſcope was not accurately adjuſted either to the meridian or horizon, but the tranſits of the Sun and of η Bootis regiſtered below are ſufficient to ſhow the rate of the going of the clock, and the correſponding altitudes of the Sun, its error a few days before the tranſit of the planet; whence the neceſſary reduction of the time then ſhewn by the clock to apparent time may be eaſily derived.

Obſervations for examining the clock.

TRANSITS.

Day of the month, 1769.		Time by the Clock.				Objeĉ
	First Wire.		Paſſage over Meridian.		Third Wire	
	′ ″	h	′	″	′ ″	
May 28	17 12	IX	18	0	18 47½	η Bootis
	Clouds		Clouds		Clouds	} Sun
	Clouds	XXIII	59	1	59 50	
29	13 19½	IX	14	7½	14 54	η Bootis
31	56 29	XXIII	57	17½	58 6½	} Sun
	58 46		59	35	0 23½	
June 1	56 39	XXIII	57	28½	58 17	} Sun
	58 56		59	46	0 34	
2	57 43½	VIII	58	32	59 19	η Bootis

Correſponding altitudes of the Sun, taken by re-
flećtion from water, with an Hadley's quadrant of
ſix inches radius.

Sun's double alt. 79° 54′   May 29, 1769

	Time by the Clock		
	Eaſtern Az.	Weſtern Az.	Meridian
	h ′ ″		
Up. limb	VIII 28 33	III 27 39	XI 58 6
Center	30 17½	25 51½	4½
Low. limb	32 8	23 57½	2¾
Mean			XI 58 4½

Sun's

Sun's double alt. 82° 55'   May 29, 1769

| | Time by the Clock | | |
	Eastern Az.	Western Az.	Meridian
	h ′ ″	h ′ ″	h ′ ″
Up. limb	VIII 39 0	III 17 8	XI 58 4
Center	40 $51\frac{1}{2}$	15 18	$4\frac{3}{4}$
Low. limb	42 $42\frac{1}{2}$	13 25	$3\frac{3}{4}$
Mean			XI 58 $4\frac{1}{6}$
Mean of both sets h ′			XI 58 $4\frac{7}{2+}$
Cor^n for the interv. 7 0			$7\frac{5}{8}$
Passage over meridian			XI 57 $56\frac{2}{3}$
Equat. of time			3 3
Clock faster than mean time			$59\frac{2}{7}$

Sun's double alt. 96° 58'   June 2, 1769

| | Time by the Clock. | | |
	Eastern Az.	Western Az.	Meridian
Up. limb	IX 27 50	II 29 44	XI 58 47
Center	29 57	27 41	49
Low. limb	32 $1\frac{1}{2}$	25 36	$48\frac{3}{4}$
Mean h ′			XI 58 48,25
Cor^n for interv. 5 0			5,65
Passage over meridian			XI 58 42,6
Equat. of time			2 28,4
Clock faster than mean time			1 11

If we suppose the clock to be 1′ 11″ faster than mean time, on June the second at noon, and to gain at the rate of $2\frac{1}{2}$ seconds in a day, then at the time of the transit of the planet it was one minute and one second slower than apparent time.

At VII^h 6′ 0″, according to the time shewn by the clock, a small indenture appeared on the Sun's limb; the increase of it at VII^h 6′ 14″, shewed plainly that it was made by the expected planet.

The

'The internal contact was firſt noted at VII^h 23' 56''; at VII^h 24' 8'', the divided part of the Sun's limb ſeemed wholly united.

The edge both of the Sun and Planet were in a continual tremor ; at the internal contact the limb of the Sun ſeemed, for ſeveral ſeconds, to be alternately united and again ſeparated by a kind of ſhootings of the Planet.

Theſe obſervations, reduced to apparent time, give the external contact at VII^h 7' 1'', the internal contact at VII^h 25' 9'', the duration 18' 8''.

The ſolar eclipſe was obſerved by the ſame clock and teleſcope. It was manifeſtly begun at XVIII^h 34' 26'', according to the time ſhewn by the clock. The ending was exactly noted at XX^h 20' 8''. The Sun's limb appeared very well defined all the morning. Theſe obſervations, reduced to ſolar time, make the beginning of the eclipſe at XVIII^h 35' 21'', the end at XX^h 21' 2'', the duration 1^h 45' 41''.

Obſervations made at Leiceſter, with an Hadley's quadrant, of ſix inches radius, for determining the latitude of the place.

1769		°	'
April 27 Sun's diameter on quadrantal arch			32
on arch of exceſs			33
repeated on quad. arch			32
on arch of exceſs			32
Sum of the meridian altitude of the Sun's upper limb, and its depreſſion, when reflected by water		103	20½
of the lower limb		102	18
29 Sun's diameter on quadrantal arch			32½
			April

1769		°	′
April 29	Sun's diameter on arch of excess		32
	repeated on quadrantal arch		33
	on arch of excess		32 +
	Merid. alt. and depression of Sun's upper limb, reflected by water	104	36
	of the lower limb	103	31
June 11	Sun's diameter on quadrantal arch		33
	on arch of excess		30
	repeated on quad. arch		33
	on arch of excess		30
	Merid. alt. and depression of Sun's upper limb, reflected by water	121	$36\frac{1}{2}$
	of the lower limb	120	33
15	Sun's diameter on quad. arch		$33\frac{1}{2}$
	on arch of excess		30
	repeated on quad. arch		$33\frac{1}{2}$
	on arch of excess		30
	Merid. alt. and depress. of Sun's upper limb, reflected by water	122	$2\frac{1}{2}$
	of the lower limb	121	$59\frac{1}{2}$

	°	′	″
The latitude of Leicester, deduced from the observations of April 27, is	52	36	21
of April 29,	52	37	3
of June 11,	52	37	35
of June 15,	52	37	12
Mean of these four observations	52	37	3
The latitude of Market Harborough, in Leicestershire, from the mean of several accurate observations of the Sun's image, projected into a dark room, by S. Rouse	52	28	30